

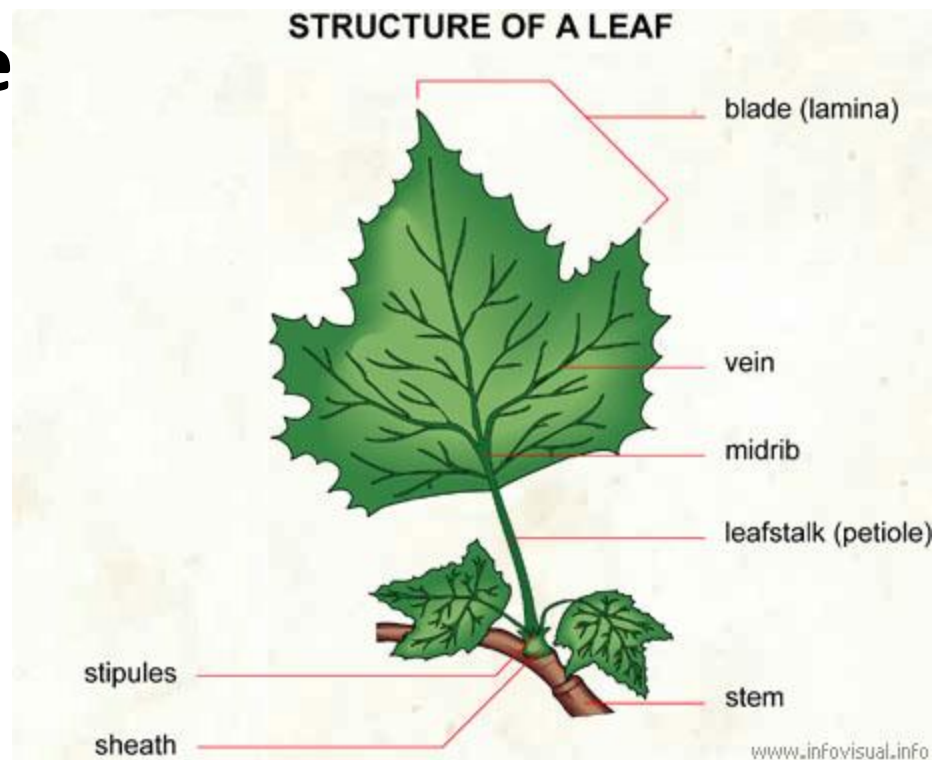
Plant Structure & Photosynthesis

Chps 8 & 22

I. The Leaf

A. Basic Structure

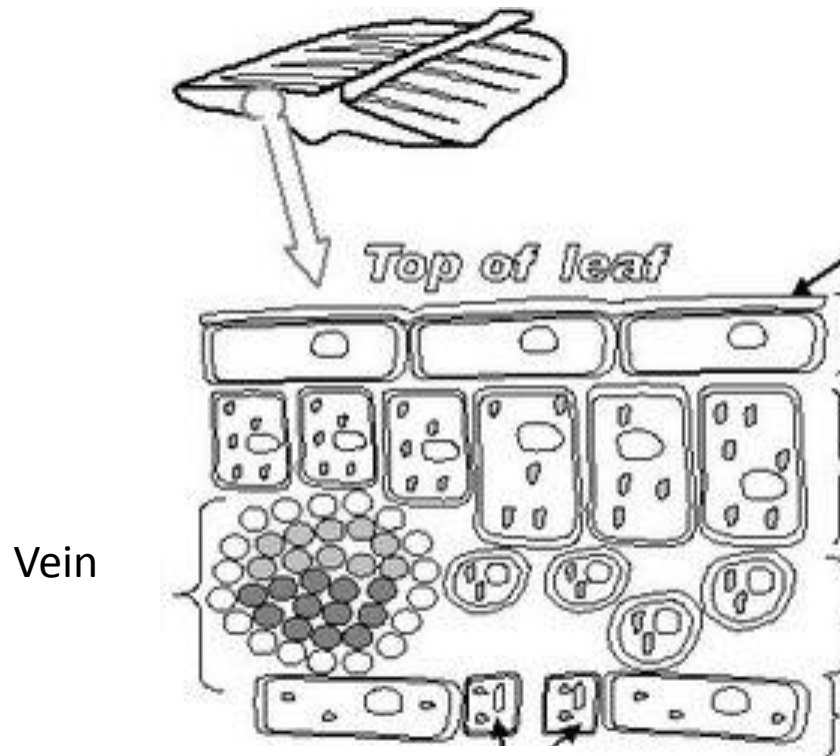
1. Blade
2. Stalk
3. Veins



B. Tissues in a leaf

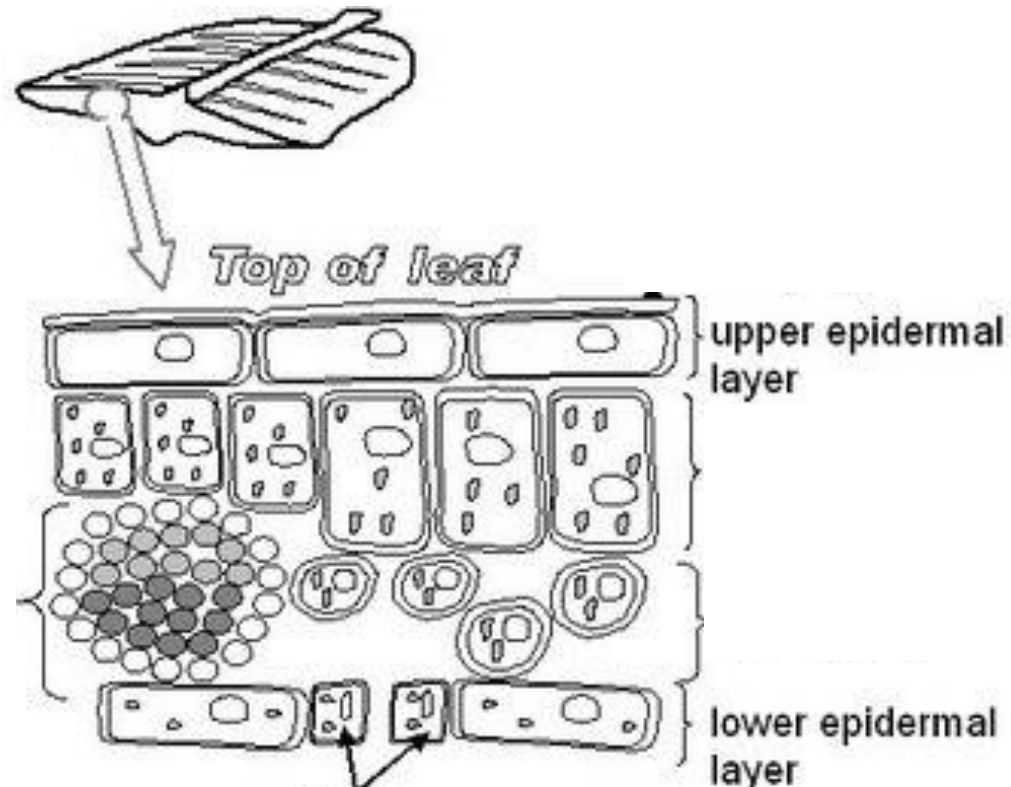
1. Veins

- a) transport (carry) materials to and from the leaf
- b) Water to the leaf
- c) Food away



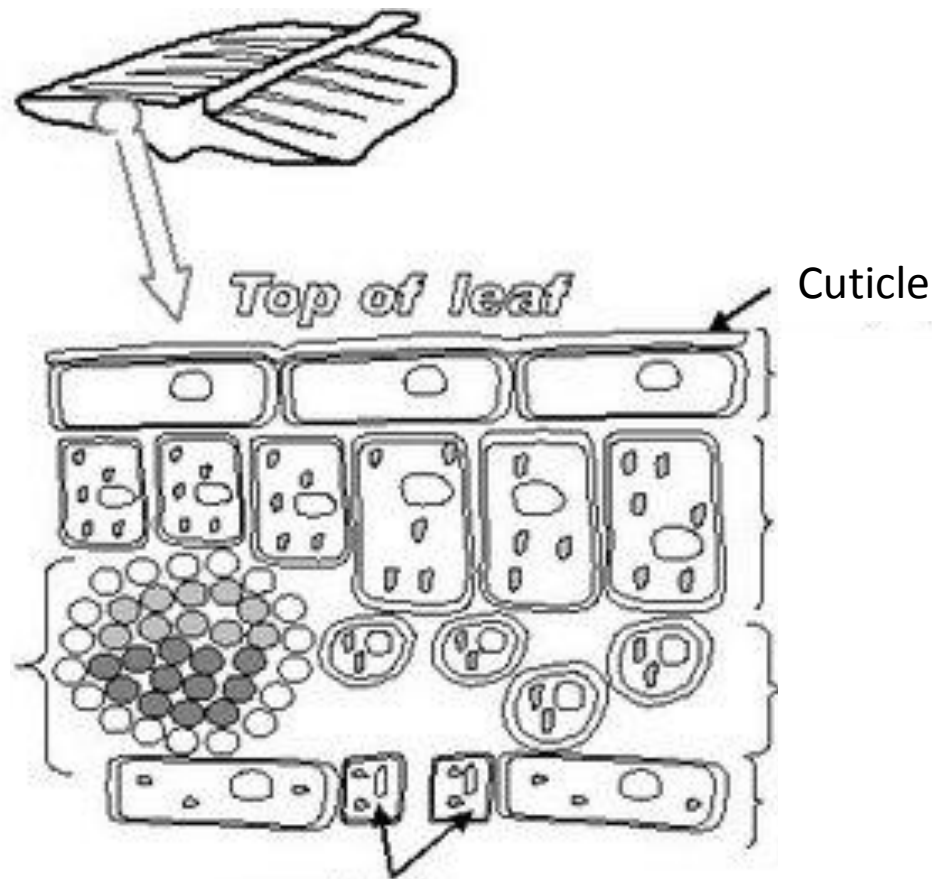
2. Epidermis

- a) Outer protective tissue of a leaf
- b) Protects from water loss
- c) Only 1 cell layer thick
- d) Upper epidermis = top of leaf
- e) Lower epidermis = underside of leaf



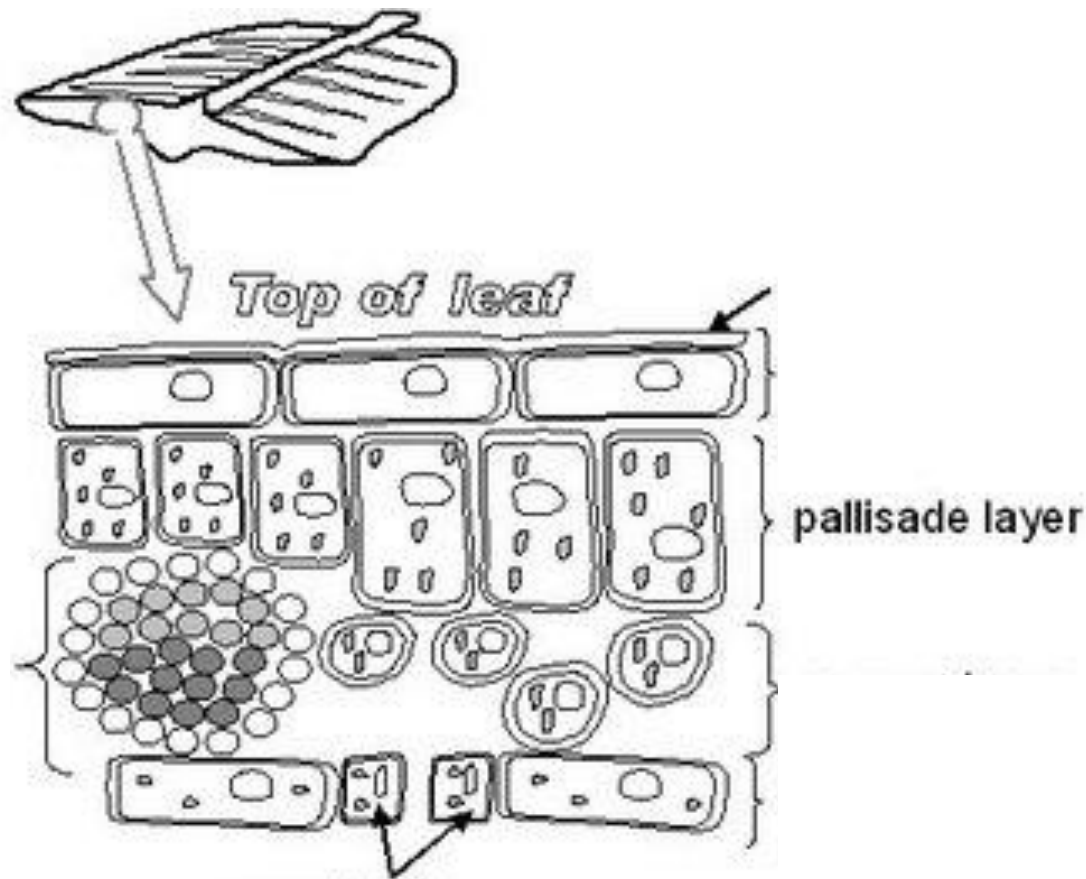
3. Cuticle

- a) Waxy layer covering the epidermis
- b) Helps protect from water loss



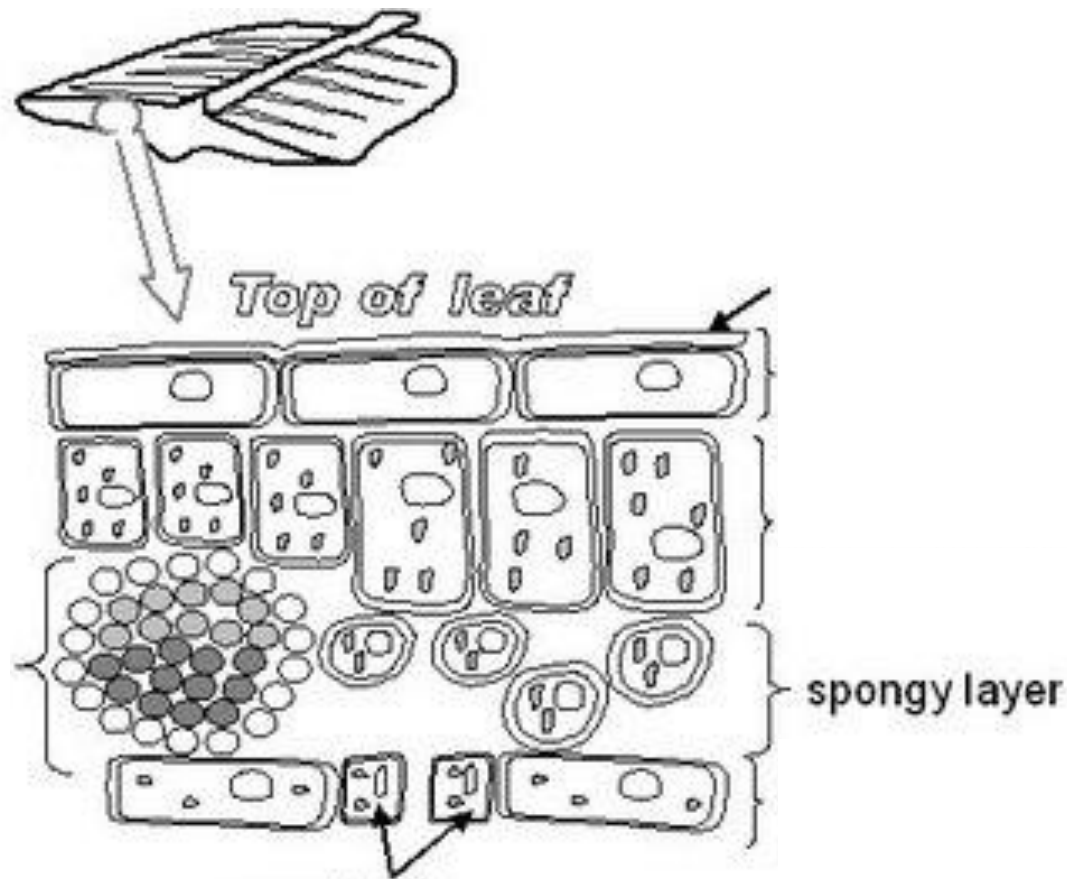
4. Palisade Layer

- a) Row of cells just below the upper epidermis
- b) Contain many chloroplasts



5. Spongy Layer

- a) Loosely packed cells below the palisade layer
- b) Contain chloroplasts

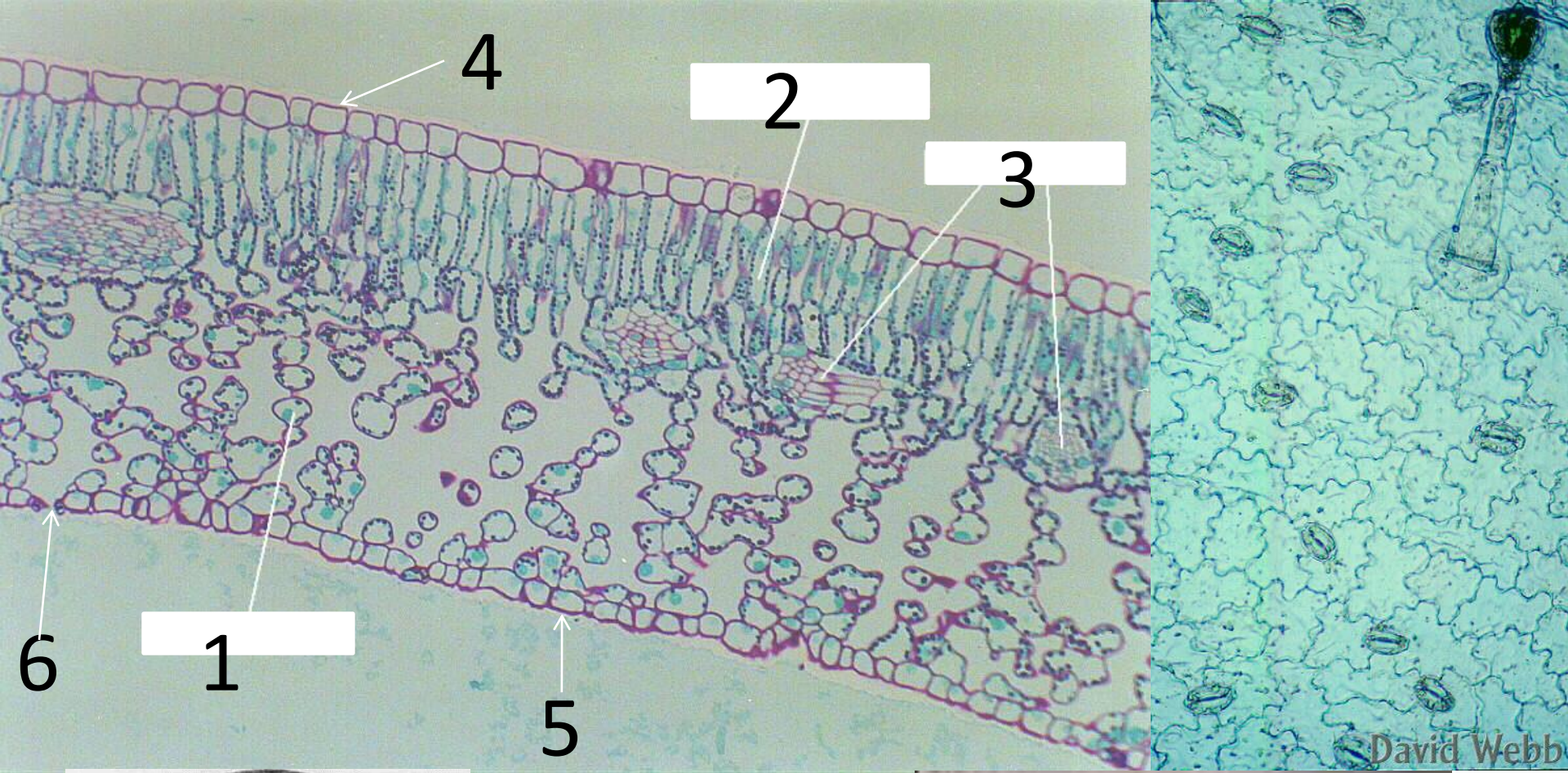


6. Stomates

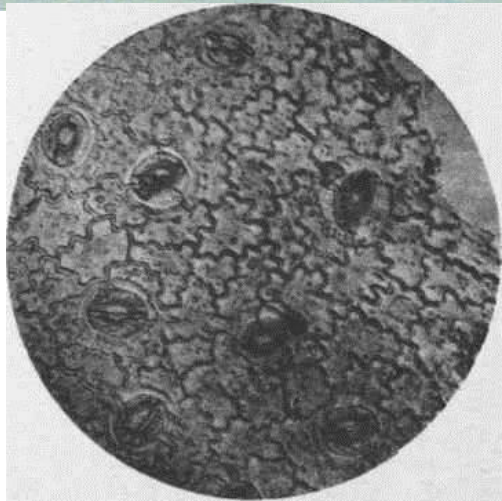
- a) Tiny openings (holes or pores) in the epidermis**
- b) CO_2 enters the leaf**
- c) H_2O and O_2 out**

7. Guard cells

- a) 2 bean shaped cells which form the stomate**
- b) Let materials in and out by opening and closing**

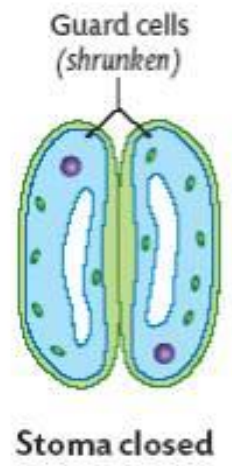
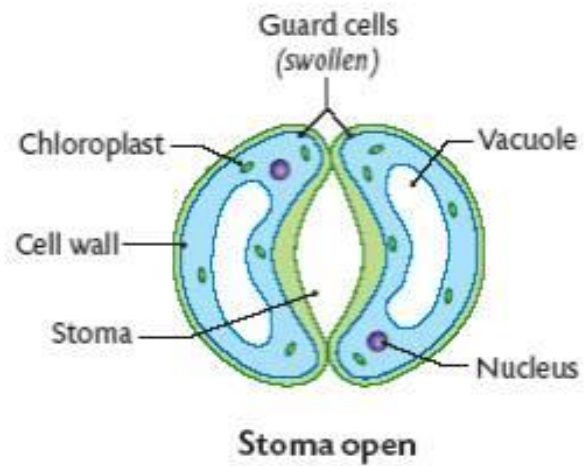
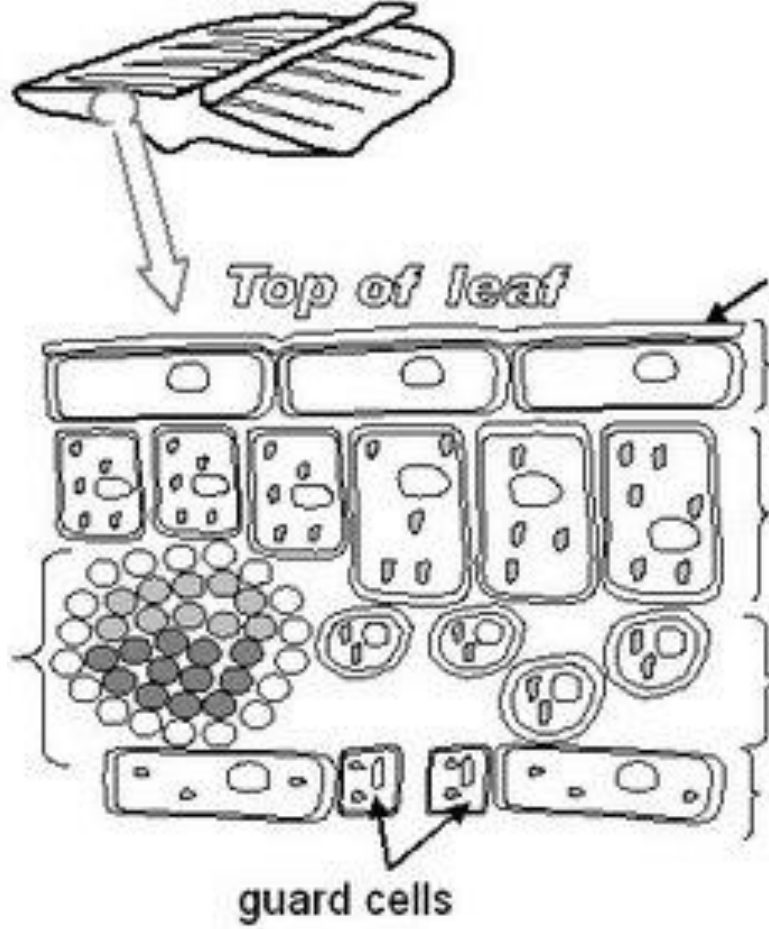


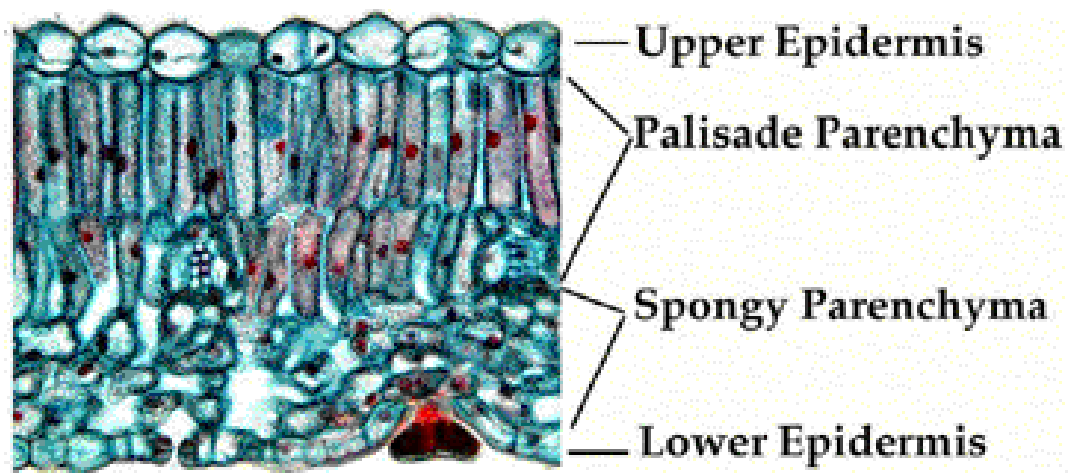
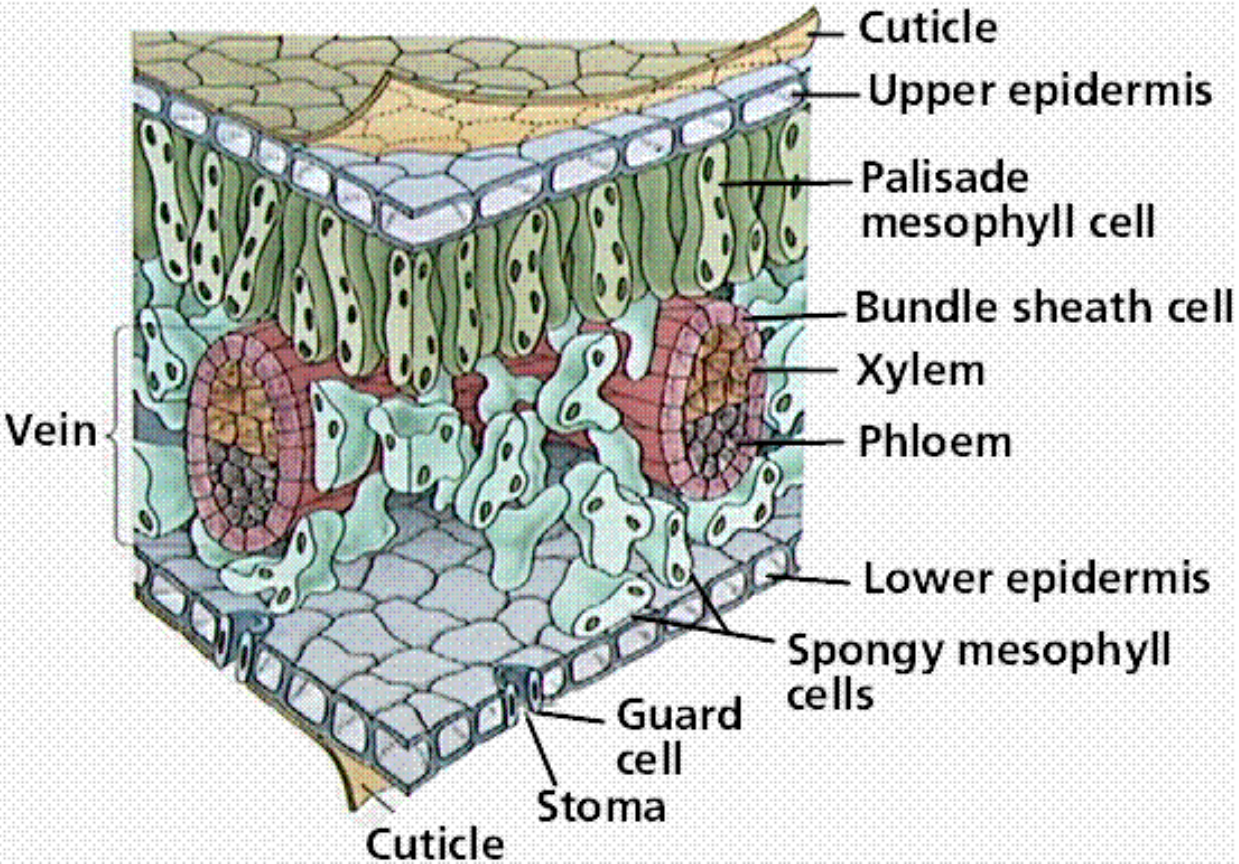
David Webb



Leaf Cross Section Quiz

- Draw a diagram of a leaf cross section and label the 8 parts.



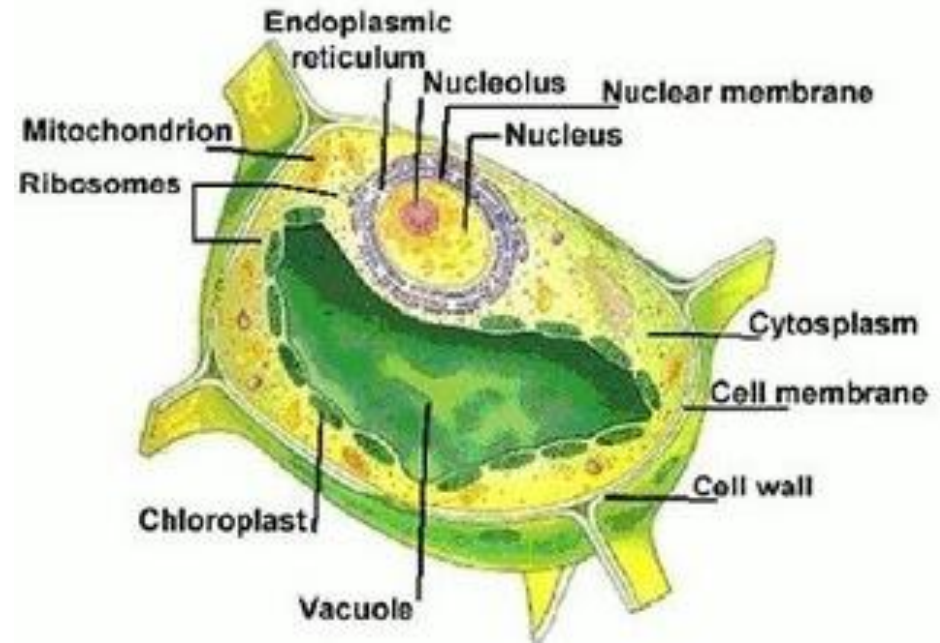


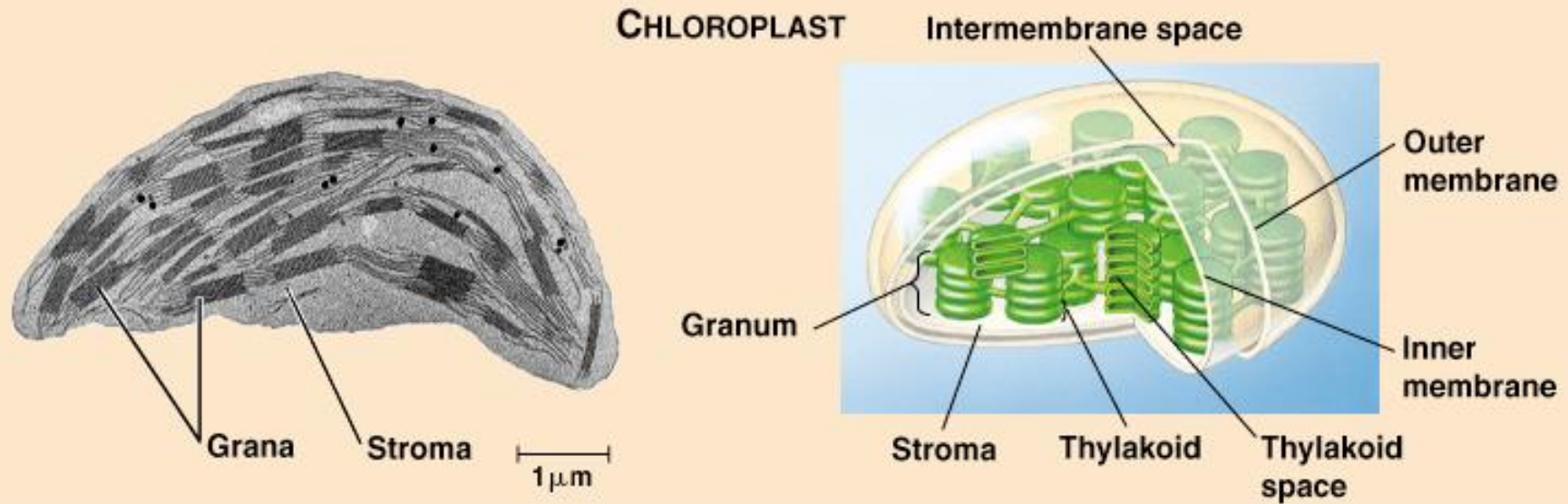
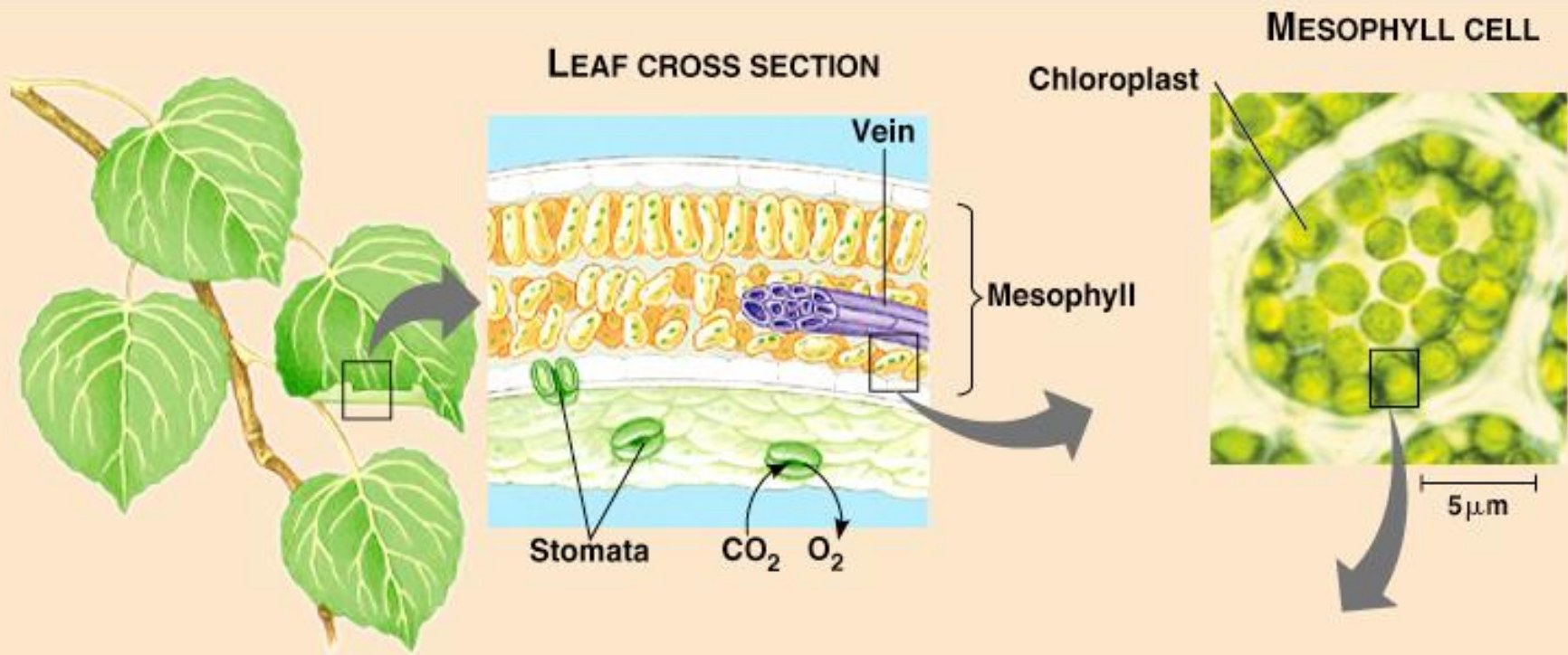
II. Food-making in plants

***Sun provides energy plants need to make food**

A. Chloroplast

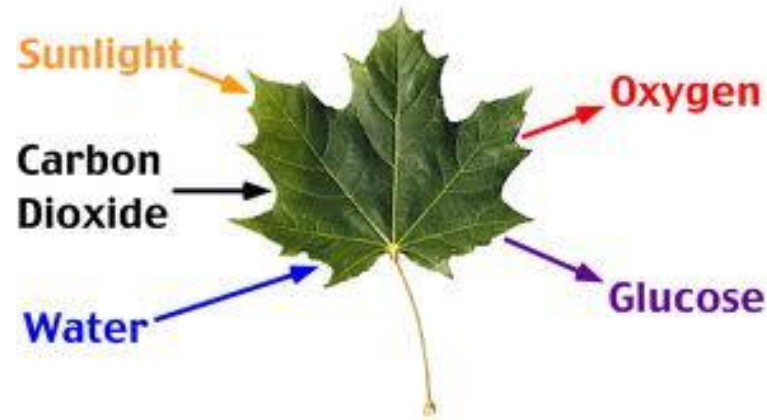
1. Green, oval structures
2. Contain **chlorophyll**
 - a) Uses sun's energy to make food
 - b) Makes plants green
 - c) Plants need light to make chlorophyll





B. Photosynthesis

1. Process by which plants use light energy to make glucose & release oxygen
2. Takes place in **chlorophyll** inside chloroplasts



Carbon Cycle - Photosynthesis



carbon
dioxide

water

sun

glucose

oxygen

3. 2 stages of photosynthesis

a) Light phase

- Requires light as a source of energy**

Step 1: chlorophyll uses energy from sun to split water molecules

Step 2: water molecules split into H & O

Step 3: O₂ released to atmosphere

Step 4: chlorophyll stores some light energy in ATP

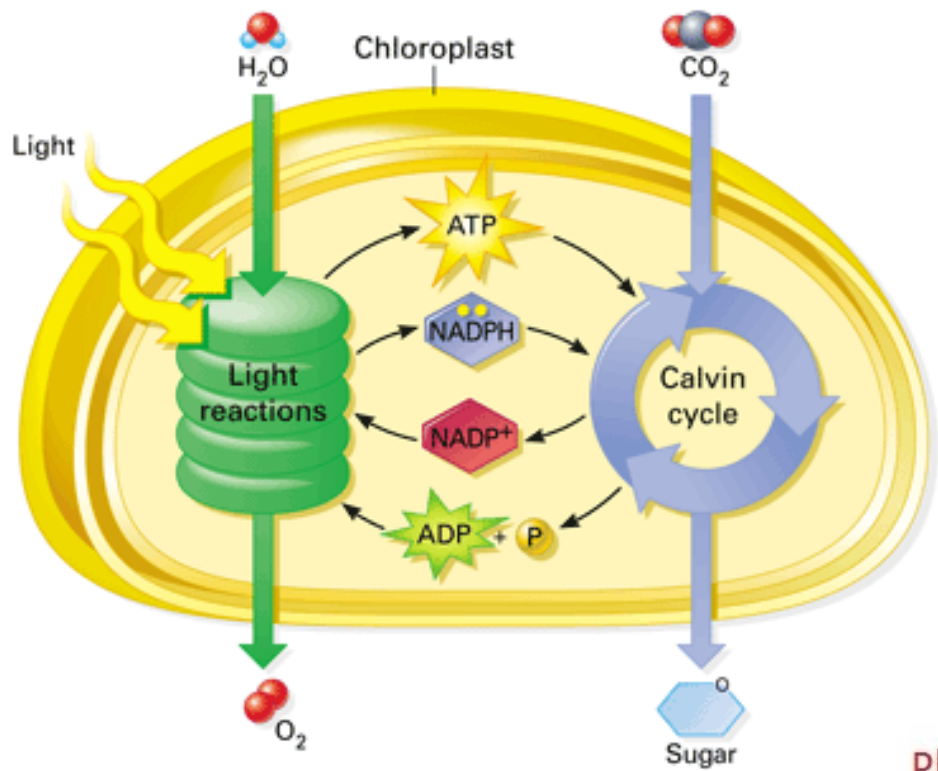
b) Dark Phase (Calvin Cycle)

- Part of photosynthesis that doesn't require light**

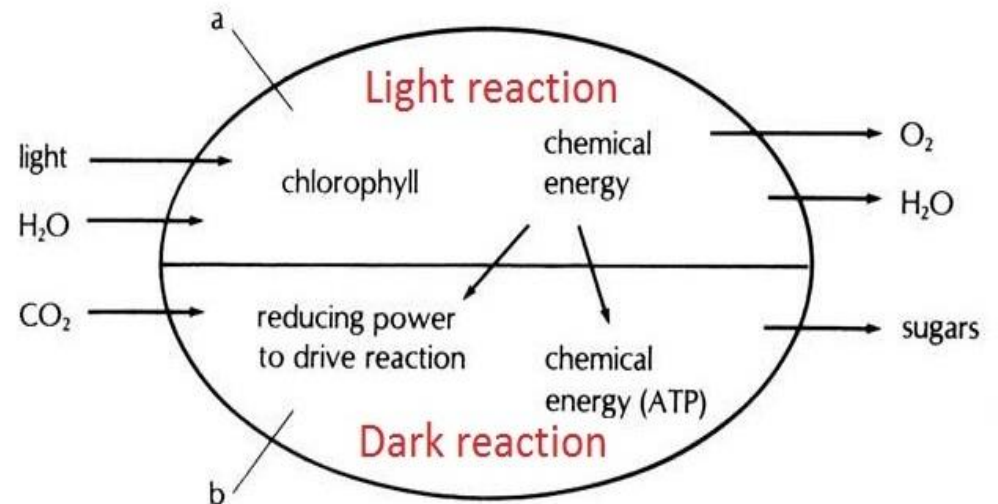
Step 1: hydrogen which split from H_2O combines with CO_2 using energy stored in ATP

Step 2: this combination forms glucose ($\text{C}_6\text{H}_{12}\text{O}_6$)

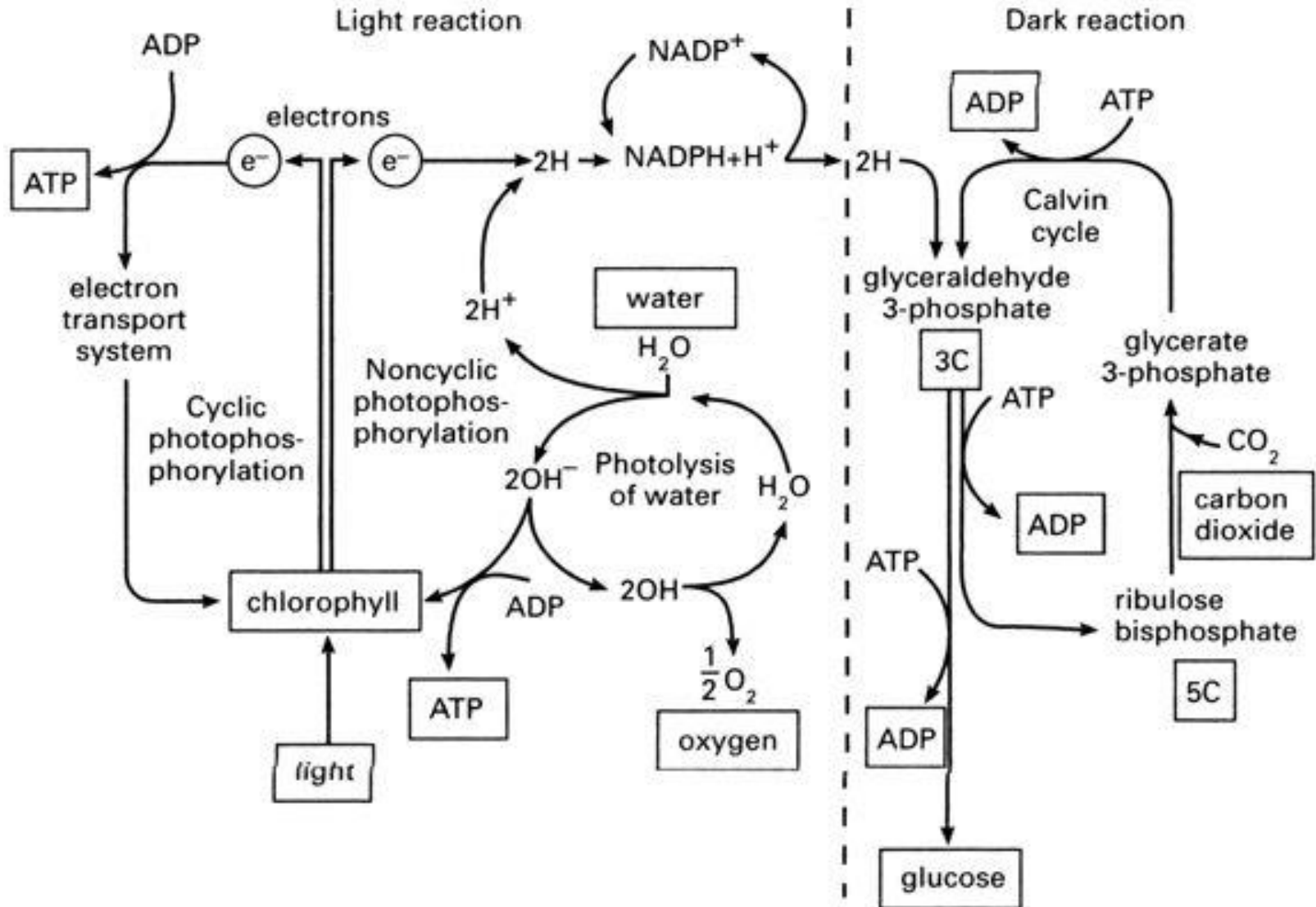
Step 3: water is formed (byproduct)



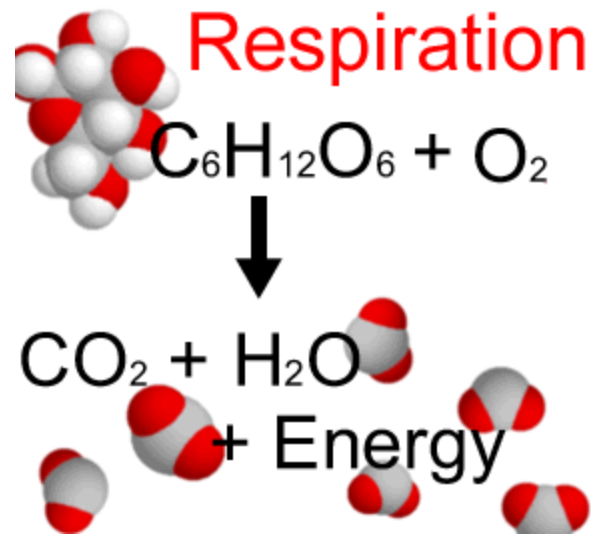
Photosynthesis reaction in chloroplast of plants



What you'll learn about photosynthesis in college...



***respiration occurs in plant cells also, when they need to release the energy stored in glucose**



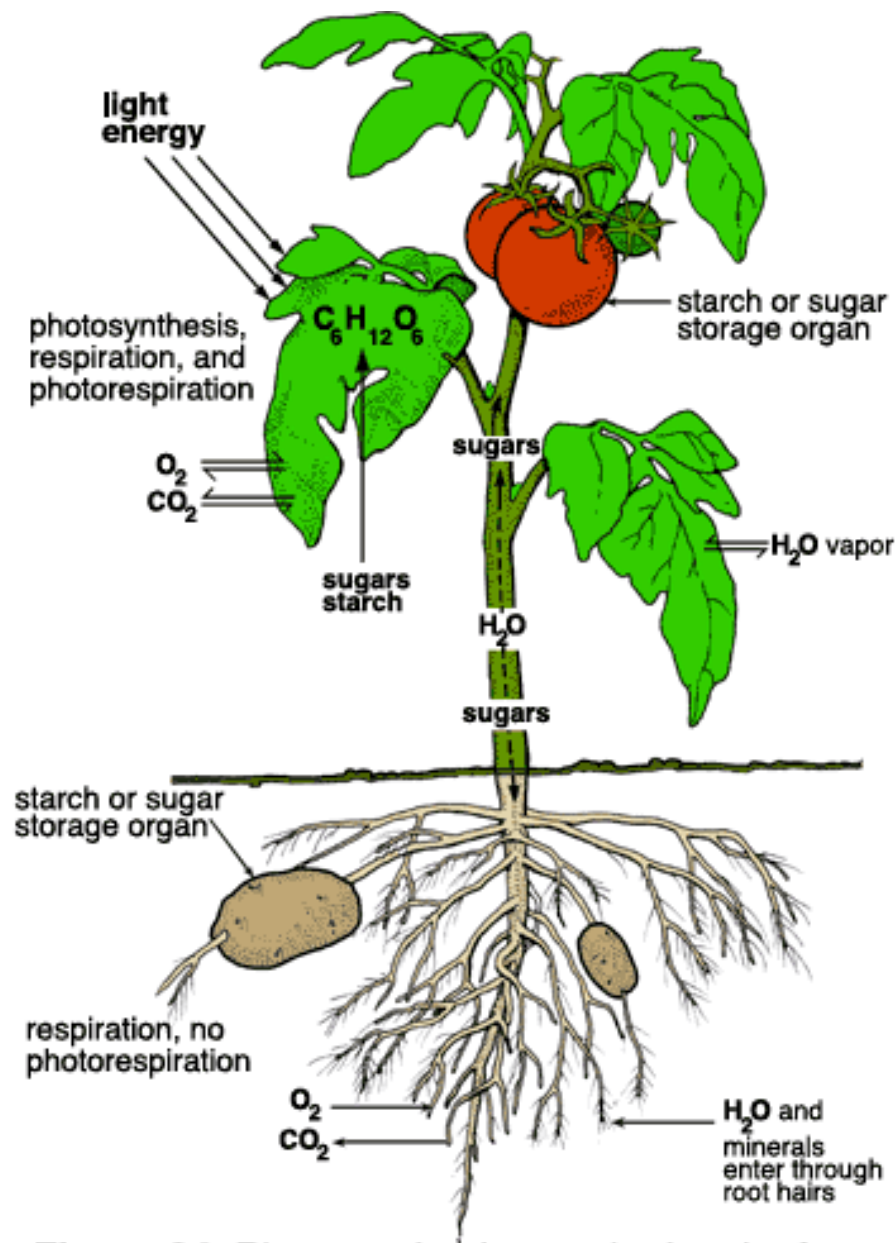


Figure 24. Photosynthesis, respiration, leaf water exchange, and translocation of sugar (photosynthate) in a plant.

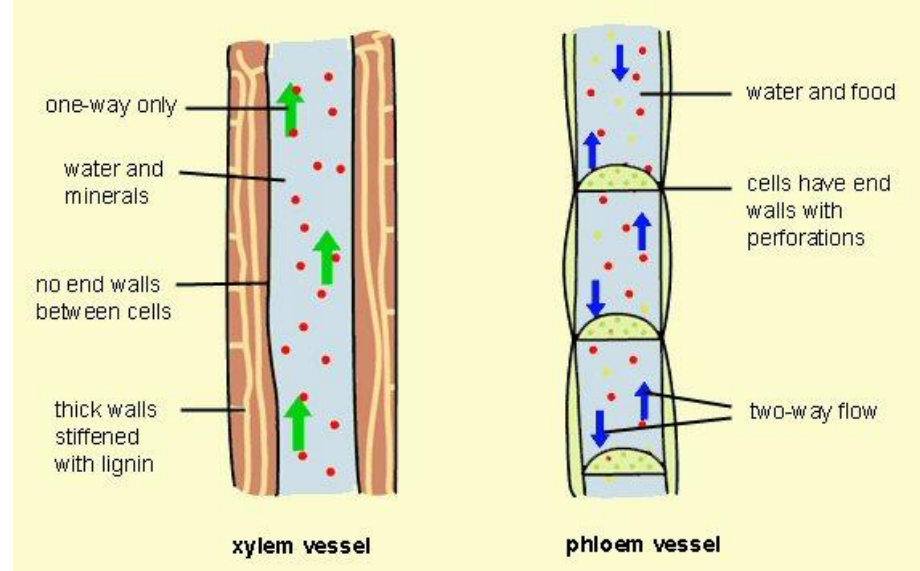
III. Transport

A. Plants need CO₂ & H₂O

1. CO₂ from air through stomates
2. H₂O from roots up through tubes into veins

B. Photosynthesis produces glucose, O₂, & H₂O

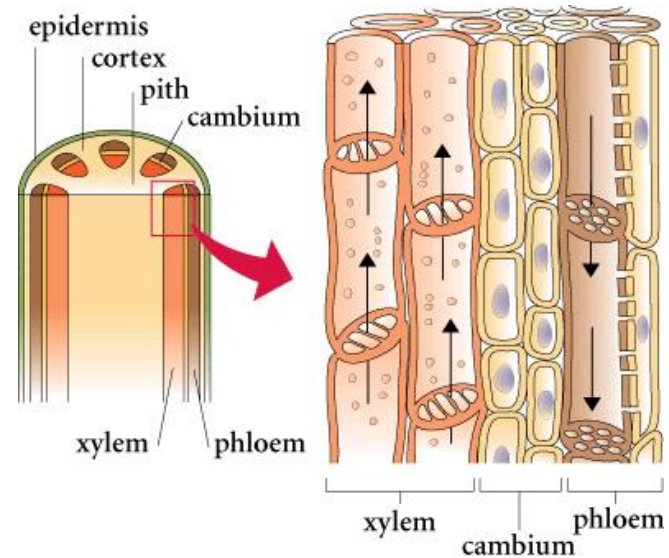
1. O₂ & H₂O out into air through stomates
2. Glucose to other parts of plant through tubes



C. Vascular system

1. Xylem

- a) Tubes that transport sap (water and nutrients) up from roots
- b) Found in stem



2. Phloem

- a) Tubes that transport dissolved food materials
- b) Glucose made in leaves moved to other parts of plant
- c) Roots store food during winter

Elizabeth Morales



IV. Growth & Response

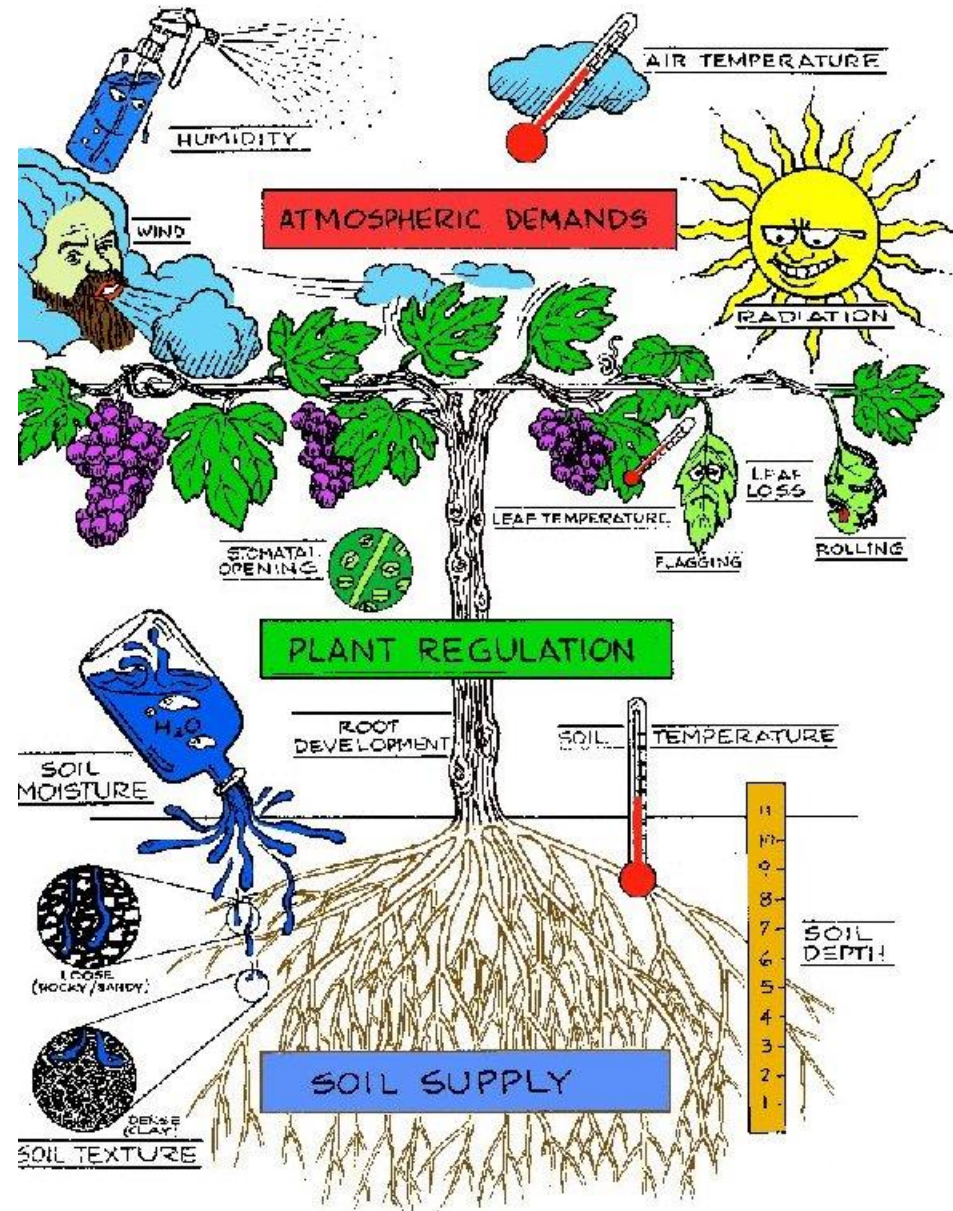
A. Hormones

1. Growth regulators
2. Chemical messenger made in one part of an organism & transported to another part
3. Transported by phloem
4. Example: ethylene = ripens fruit



B. Stimuli

1. Any change in the environment that causes a response in an organism
2. Can trigger plant hormones



C. Tropism

- **Growth of a plant in response to a stimulus**
- **Hormone = auxin**

1. Phototropism: response to light

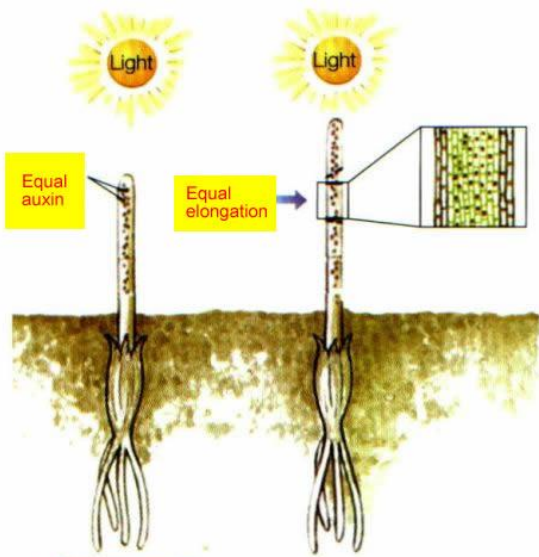
- **Positive: leaves & stem grow toward light**
- **Negative: roots grow away**

2. Gravitropism: response to gravity

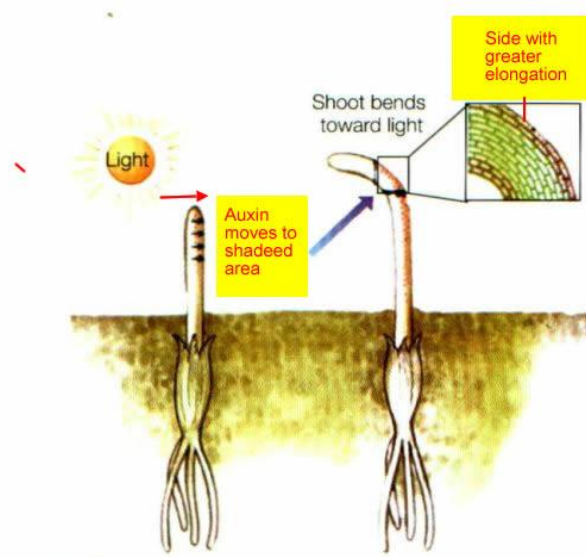
- **Positive: roots grow down**
- **Negative: stems grow up**

3. Thigmotropism: response to contact

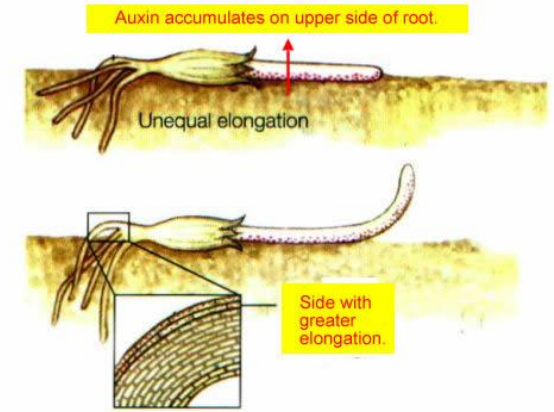
- **Helps vines wind around support**



(a) Straight growth



(b) Phototropism



(c) Gravitropism

